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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/761,128	01/20/2004	Yasuo Arishima	5271-0111PUS1	8831
2292 7590 01/07/2008 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			EXAMINER CHUO, TONY SHENG HSIANG	
			ART UNIT 1795	PAPER NUMBER
			NOTIFICATION DATE 01/07/2008	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

<b>Office Action Summary</b>	Application No. 10/761,128	Applicant(s) ARISHIMA ET AL.	
	Examiner Tony Chuo	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 31 October 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,3-10 and 12-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-10 and 12-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/31/07 has been entered.

### ***Response to Amendment***

2. Claims 1, 3-10, and 12-22 are currently pending. Claims 2 and 11 have been cancelled. New claims 19-22 have been added. The amended claims do overcome the previous 103 rejection of claims 1, 4, 6, 10, 13, and 15 as being unpatentable over Tabata et al in view of Ueda et al. However, upon further consideration, claims 1, 3-10, and 12-22 are rejected under the following new 103 rejections.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 3, 4, 6-10, 12, 13, and 15-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tabata et al (US 2002/0071980) in view of Ueda et al (US 2004/0115515), and further in view of Kohler et al (US 2003/0224233).

The Tabata reference discloses a fuel cell comprising: a membrane electrode assembly comprising a positive electrode, a negative electrode, and a solid polymer electrolyte membrane in between the positive and negative electrodes, wherein both the positive and negative electrodes comprises a laminate of two catalyst layers "2a" / "3a" & "2b" / "3b" and an ion-conducting resin, and wherein the catalyst layers are bonded together by a solvent which functions as an adhesive layer (See paragraphs [0031],[0032],[0041] and Figure 4). In addition, it also discloses a catalyst content of each catalyst layer that is  $0.01 - 1 \text{ mg/cm}^2$  which corresponds to a catalyst content in the laminate that is  $0.02 - 2 \text{ mg/cm}^2$  (See paragraph [0042]). In addition, it also discloses the use of the membrane electrode assemblies in fuel cells (See paragraph [0019]).

However, Tabata et al does not expressly teach each of the electrode layers that has a thickness of at most  $50 \text{ }\mu\text{m}$ ; a laminate that has a total thickness of 30 to  $300 \text{ }\mu\text{m}$ ; or a laminate that has a total thickness of 70 to  $300 \text{ }\mu\text{m}$ . The Ueda reference discloses a bilayer structure catalyst layer wherein each catalyst layer has a thickness that is usually 2 to  $50 \text{ }\mu\text{m}$  which corresponds to a total thickness of the laminate that is 4 to  $100 \text{ }\mu\text{m}$  (See paragraph [0072]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Tabata fuel cell to include each of the electrode

layers that has a thickness of at most 50  $\mu\text{m}$ ; a laminate that has a total thickness of 30 to 300  $\mu\text{m}$ ; or a laminate that has a total thickness of 70 to 300  $\mu\text{m}$  in order to minimize the overall thickness of the fuel cell, thereby maximizing the current density of the fuel cell. In addition, product claims with numerical ranges which overlap prior art ranges were held to have been obvious under 35 USC 103 (See *In re Wertheim* 191 USPQ 90 (CCPA 1976)).

However, Tabata et al as modified by Ueda et al does not expressly teach an adhesive layer that contains a polymer material having a proton conducting property that is present more in an interface part of each of the electrode layers than in an inner part. The Kohler reference teaches the concept of using a carbon black containing adhesive paste to laminate two electrode layers wherein the adhesive contains a Nafion solution that has proton conducting property (See paragraph [0048]). Examiner's note: It is inherent that the polymer material is present more in an interface part of each of the electrode layers than in an inner part because the adhesive layer is coated on the surface of each electrode layer which is also the interface part of each electrode layer.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Tabata/Ueda fuel cell to include an adhesive layer that contains a polymer material having a proton conducting property that is present more in an interface part of each of the electrode layers than in an inner part in order to securely bond the electrode layers together by using a low temperature/low pressure laminating process that simplifies the handling and assembly of the membrane electrode assembly. In addition, the invention as a whole would have been obvious to

one of ordinary skill in the art at the time the invention was made because the disclosure of Kohler et al indicates that an adhesive paste that contains a Nafion solution with proton conducting properties is a suitable material for use as an adhesive for bonding electrode layers. The selection of a known material based on its suitability for its intended use has generally been held to be *prima facie* obvious (MPEP §2144.07). As such, it would be obvious to use an adhesive paste that contains a Nafion solution with proton conducting properties.

5. Claims 5 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tabata et al (US 2002/0071980) in view of Ueda et al (US 2004/0115515) and Kohler et al (US 2003/0224233) as applied to claims 1 and 10 above, and further in view of Dube et al (US 2004/0089357).

However, Tabata et al as modified by Ueda et al and Kohler et al does not expressly teach an adhesive layer that has a thickness of 1 to 5  $\mu\text{m}$ . The Dube reference discloses an integrated fuel cell device wherein the layers are laminated with adhesive layers that are thinned to a 5  $\mu\text{m}$  thickness (See paragraph [0048],[0049]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Tabata/Ueda/Kohler fuel cell to include an adhesive layer that has a thickness of 1 to 5  $\mu\text{m}$  in order to reduce the resistance between the electrode layers, thereby improving the performance of the fuel cell.

***Response to Arguments***

6. Applicant's arguments filed 10/9/07 have been fully considered but they are not persuasive.

The applicant argues that the technology of Kohler et al is not applicable to the fuel cell described in Tabata et al, and there is no suggestion or motivation to do so because the fuel cell described in Tabata et al is a laminate constituted by at least six layers from the anode-side gas diffusion layer to the cathode-side gas diffusion layer and the fuel cell described in Kohler et al is limited to the one constituted by five layers from the anode gas diffusion layer to the cathode gas diffusion layer. The applicant also argues that the examiner has alleged that Kohler et al mentions the concept of laminating two catalyst layers using an adhesive. Firstly, the examiner would like to correct the applicant statement about Kohler et al teaching the concept of laminating two catalyst layers. In the previous office action, the examiner clearly stated that Kohler et al teaches the concept of using an adhesive paste to laminate two electrode layers. Secondly, there is no evidence to show that an adhesive that is used to laminate a catalyst layer and a gas diffusion layer, cannot be used to laminate two catalyst layers. For this reason, the examiner maintains the assertion that an adhesive paste that is used to laminate a catalyst layer and a gas diffusion layer, is also suitable for laminating two catalyst layers. Finally, it would have been obvious to one of ordinary skill in the art to substitute the Kohler adhesive for the Tabata adhesive because the simple substitution of one known element for another would have yielded predictable results of effectively bonding the catalyst layers together to form a laminate.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tony Chuo whose telephone number is (571) 272-0717. The examiner can normally be reached on M-F, 7:00AM to 3:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TC

  
JONATHAN CREPEAU  
PRIMARY EXAMINER